

Application No. 08/962,362

least about 95 percent of the particles have a diameter greater than about 60 percent of the average diameter and less than about 140 percent of the average diameter.

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33. (New) The display device of claim 31 wherein the phosphor particles comprise a metal compound selected from the group consisting of ZnO, ZnS, TiO<sub>2</sub> and Y<sub>2</sub>O<sub>3</sub>.

34. (New) The display device of claim 1 wherein the phosphor particles are roughly spherical.

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#### REMARKS

Claims 1-6, 20-30 and 32-34 are pending. By this Amendment, claims 1, 2 and 20 are amended and new claims 31-33 are added. Applicants have amended claims 1 and 20 in part to clarify the relationship of the first collection of particles and the second collection of particles. The amendment of claim 1 is supported by the specification, for example, at page 15, lines 15-18 and page 20, lines 15-21. Claim 2 has been amended for consistency with the amendment of claim 1. The amendment of claim 20 is supported by the specification, for example, at page 23, line 33 to page 24, line 2. New claims 32 and 33 are supported by the specification, for example, at page 2, lines 11-22 and page 18, lines 5-9. New claim 34 is supported by the specification, for example, at page 18, lines 9-10. No new matter is introduced by the amendments or the new claims.

To advance prosecution of this case, Applicants comment on an Error of Law and an Error of Fact made by the Board of Patent Appeals and Interferences in rendering their decision of March 18, 2003. Applicants further comment on a new factual issue raised by the Board.

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Clarification Of Patentability Of Compositions Of Matter

In the Board's Decision at page 4 to page 5 (crossover paragraph) and at the top of page 8 (crossover paragraph), the Board indicated that "it is apparently applicants' position (although not expressly stated) that they are entitled to broadly claim the particle size and uniformity limitations without reciting the method of production . . . ." These statements seem to reflect a fundamental misunderstanding of the law on patentability of compositions of matter. Process limitations do not impart patentability except to the extent that the process limitations necessarily imply structure. See, MPEP 2113; Scripps Clinic v. Genentech Inc., 18 USPQ2d 1001, 1016 (Fed. Cir. 1991) ("In determining patentability we construe the product as not limited by the process stated in the claims.") overruled in other aspects, see Atlantic Thermoplastics Co. Inc. v. Faytex Corp., 23 USPQ2d 1801 (Fed. Cir. 1992); and Atlantic Thermoplastics Co. Inc. v. Faytex Corp., 23 USPQ2d 1481, 1491 (Fed. Cir. 1992) ("The PTO's treatment of product-by-process claims as a product claim for patentability is consistent with policies giving claims their broadest reasonable interpretation."). Therefore, the fact that Appellants' claims do not recite process limitations has nothing to do with the breadth of the claims, but relates to the fact that the new and unobvious properties of the compositions are well recited without reference to the process for making them. To the extent that the Board's decision was based on some incorrect legal concept that process limitations are generally required for patentability of compositions of matter, the Board's Decision reflected an error of law. Further consideration of the pending claims should be based on correct legal principles.

Error of Fact In Not Giving Weight to Professor Bricker's Declaration

At page 17, the Board concluded that the Declaration of Professor Bricker was not entitled to weight. The Board reached this conclusion based on an assertion that Professor Bricker's Declaration was "based on a fundamental assumption that a process where a mixture of different sized particles is continuously loaded onto the cloth will not work to separate different

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size classes of quantum particles because particles are continuously remixed with particles of other sizes as additional particles are loaded onto the cloth." Decision at page 18. While this is the process explicitly described in the Jaskie patent at column 7, lines 30-31 ("The quantum contained particles (of all sizes) are suspended in a wet mixture."), the Bricker Declaration does not rely on this assumption, although the Declaration commented on this feature since the Jaskie procedure explicitly calls for this approach. More fundamental problems with the Jaskie process are also described in the Bricker Declaration. For example, "Significantly, the technique will not work because no cloth is known with the necessary properties to differentially interact with different sized particles." Bricker Declaration at paragraph 9. Other problems with the Jaskie approach unrelated to the approach for getting the particles on the cloth are discussed in detail in paragraphs 10 and 11 as well as the end of paragraph 9 of the Bricker Declaration.

Thus, the assumption cited by the Board only related to one shortcoming of the Jaskie process pointed out by Professor Bricker. The more fundamental shortcomings relate to the lack of a known material to provide the appropriate size separation process. Thus, the Board's statements on page 18, that the particles could be loaded a single time on the cloth, do not result in a workable process without overcoming the other fatal shortcomings noted in the Bricker Declaration. The Board's statements that the particles will climb different amounts on the cloth dependent on their size reflects a misunderstanding of the process and ignores the extensive statements in paragraph 10 of the Bricker Declaration that have nothing whatsoever to do with how the particles are loaded onto the cloth.

The Board made a clear error of fact in ignoring major portions of the Bricker Declaration. Applicants have clearly demonstrated by a preponderance of the evidence that the Jaskie patent does not allow a person of ordinary skill in the art to practice a wet separation process for inorganic nanoparticles without undue experimentation.

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New Factual Issue Raised Regarding the Jaskie Patent

At pages 5 and 6, for example, the Board raised issues regarding the disclosure in the Jaskie patent of nanocrystals formed by the micelle or inverse micelle technique. As stated by the Board on page 6 of the Decision, "although not noted by the examiner or appellants, it appears that Jaskie discloses a method of producing particles having a highly uniform distribution of diameters within the claimed range (although Jaskie does not specifically mention the 95 percent figure)." In view of the Board's reliance on these statements, Applicants have examined these issues further.

Under conventional usage, nanocrystals generally refers to crystallites within polycrystalline particles. Thus, the size and size distribution of the crystallites does not directly reflect the particles size and size distribution. For example, as described at page 41, lines 11-13 of WO 98/37165 (of record in the present case), the average crystallite size is preferably at least about 40 percent of the average particle size in the embodiments described therein. In some circumstances, the average crystallite size is evaluated from measurements of the broadening of the x-ray diffractogram peaks, and no information may be provided on the average particle size.

Applicants previously realized the presence in the Jaskie patent of the language on the micelle techniques relied on by the Board. Since nanocrystal properties do not generally reflect the nature of the particles, Applicants assumed that the particle properties of the CdS nanocrystals did not reflect the particle properties, based on standard usage of the nanocrystal terminology. In view of the Board's decision, Applicants examined the Goldstein et al. publication in the Mat. Res. Soc. Symp. Proc. of 1991. It was not immediately clear from the paper how the particle size and size distribution are related to the crystallite size and distribution. The Board further included with their Decision, a publication by Steigerwald et al. which was also not clear about the relationship of the particle size with the crystallite size.

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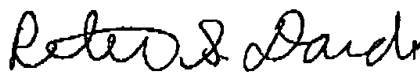
On further examination, Applicants found a reference to Murray et al. that clearly describe unaggregated nanocrystals when formed by the micelle approach. This reference is attached as part of an IDS submitted with this Request For Continued Prosecution. Applicants have also attached another review from 2001 for reference by the Examiner. The particles in the Murray et al. reference are limited to sulfides, selenides and tellurides with an average particle size up to about 12 nm (120 angstroms). Thus, Applicants' present claims are distinct from these materials.

## CONCLUSIONS

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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## CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being transmitted by facsimile to the U.S. Patent and Trademark Office, Fax No. 703-872-9319 on the date shown below thereby constituting filing of same.

May 16, 2003

Date



Shari R. Thorndike

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ATTACHMENT  
REDLINED AMENDMENTClaims As Amended

Claims 1, 2 and 20 have been amended as follows:

1. (Twice Amended) A display device comprising phosphor particles having an average diameter less than about 100 nm and wherein the phosphor particles comprise a first collection of particles having a diameter distribution such that at least about 95 percent of the particles have a diameter greater than about 40 60 percent of the average diameter and less than about ~~160~~ 140 percent of the average diameter and the phosphor particles comprising a metal oxide.
2. (Amended) The display device of claim 1 wherein the phosphor particles comprise a metal compound selected from the group consisting of ZnO, ~~ZnS~~, TiO<sub>2</sub> and Y<sub>2</sub>O<sub>3</sub>.

New claims 32-34 have been added as follows:

32. (New) A display device comprising a collection of phosphor particles having an average diameter from about 15 nm to about 100 nm and having a diameter distribution such that at least about 95 percent of the particles have a diameter greater than about 60 percent of the average diameter and less than about 140 percent of the average diameter.
33. (New) The display device of claim 31 wherein the phosphor particles comprise a metal compound selected from the group consisting of ZnO, ZnS, TiO<sub>2</sub> and Y<sub>2</sub>O<sub>3</sub>.
34. (New) The display device of claim 1 wherein the phosphor particles are roughly spherical.